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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/891,523	06/27/2001	Ryan N. Rakvic	2207/1123601	3187

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EXAMINER
INOA, MIDYS

ART UNIT	PAPER NUMBER
2188	10

DATE MAILED: 08/27/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

9

Office Action Summary	Application No. 09/891,523	Applicant(s) RAKVIC ET AL.	
	Examiner Midys Inoa	Art Unit 2188	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *27 June 2003* .

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-7 and 9-28* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-5 and 9-28* is/are rejected.

7)☒ Claim(s) *6 and 7* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *27 June 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *1* .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Information Disclosure Statement

1. The information disclosure statement (IDS) submitted on June 27th, 2003 has been considered by the examiner.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 1-5 and 19-25 are rejected under 35 U.S.C. 102(e) as being anticipated by Maiyuran et al. (US 2001/0129201 A1).

Regarding Claims 1-3 and 19, Maiyuran et al. teaches a cache architecture in which a cache is organized into a number of independent cache ways ("cachelets"). This cache is part of a multiple layer cache system since each cache way can be interpreted to be an independent layer of the cache. Maiyuran further discloses an address decoder ("means for distributing independent loads...", "address manager") coupled to each of the cache ways which distributes address requests to the independent ways (Page 1, Paragraphs 14-15).

Regarding Claim 4, Maiyuran et al teaches a cache architecture organized into a number of cache ways ("cachelets") in which each way has a number of cache entries 110 divided into a tag, data, and stage fields. Maiyuran teaches a decoder 140 coupled to each way and each cache

entry 110 within each way and a tag comparator 150 coupled to the input address and the tag field of the cache entry (see figure 1).

Regarding Claim 5, Maiyuran et al. teaches an independent way ("cachelets") cache system in which address inputs to each way are independently distributed to each way by the decoder 140 (see figure 1).

Regarding Claim 20-21, Maiyuran et al. teaches that when the tag comparator signals cache miss occurs in one of the cache ways, the next way is selected as a victim and so, the request will be sent to that next way in order to try and fulfill it (Pages 2 – 3, Paragraphs 32-33).

Regarding Claims 22-23, Maiyuran et al. teaches a cache architecture in which a cache is organized into a number of independent cache ways ("cachelets"). This cache is part of a multiple layer cache system since each cache way can be interpreted to be an independent layer of the cache. Maiyuran further discloses an address decoder ("means for distributing independent loads...", "address manager") coupled to each of the cache ways which distributes address requests to the independent ways (Page 1, Paragraphs 14-15). In addition, Maiyuran et al. teaches that when the tag comparator signals cache miss occurs in one of the cache ways, the next way is selected as a victim and so, the request will be sent to that next way in order to try and fulfill it (Pages 2 – 3, Paragraphs 32-33).

Regarding Claims 24-25, Maiyuran et al. teaches a cache architecture in which a cache is organized into a number of independent cache ways ("cachelets"). This cache is part of a multiple layer cache system since each cache way can be interpreted to be an independent layer of the cache. Maiyuran further discloses an address decoder ("means for distributing independent loads...", "address manager") receiving addressed requests and distributing such

requests to the independent ways (Page 1, Paragraphs 14-15). Maiyuran also teaches that when the cache request is a write request, all tag fields and address fields of all ways are energized and therefore, a simultaneous write request to all the ways is possible (Page 3, Paragraph 37).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 9-18 and 26-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Maiyuran et al. (US 2002/0129201 A1) in view of Gruber et al. (6,115,793).

Regarding Claims 9-12, 14-18 and 26-28, Maiyuran et al. teaches a cache architecture in which a cache is organized into a number of independent cache ways ("cachelets"). This cache is part of a multiple layer cache system since each cache way can be interpreted to be an independent layer of the cache. Maiyuran further discloses an address decoder ("means for distributing independent loads...", "address manager") which receives multiple addressed data requests and distributes non-confliction address requests to the independent ways by dividing these requests into "sets" ("cachelet pointers", Page 1, Paragraphs 14-15). Maiyuran et al. does not teach determining if a cachelet pointer conflict occurs (or if any of the data requests are not valid) and forwarding one of the conflicting requests to the identified location and reassigning the other request to an unused location. Gruber et al. teaches a cache system in which conflicting requests (or invalid requests) are resolved by allowing the first of the conflicting request to access the desired location while the second is reassigned to a free physical cache location (see

Abstract and Column 4, lines 40-49). It would have been obvious to one of ordinary skill in the art at the time the invention was made to integrate the cache system of Maiyuran et al. with the conflict resolution procedure of Gruber et al. since this procedure would reduce the latency involved with conflicting cache requests by reassigning one of the conflicting requests to another cache area.

Regarding Claim 13, Maiyuran et al. in view of Gruber et al. teaches the invention as set forth by Claim 10 above. Maiyuran et al. in view of Gruber et al. does not teach storing copies of a single data item in multiple cachelets (ways). It would have been obvious to one of ordinary skill in the art at the time the invention was made to store copies of the same data item in multiple cachelets since cachelets behave similarly to independent caches and in a common multiple cache system data that is stored in one cache is also stored in the other system caches.

Response to Arguments

6. Applicant's arguments with respect to claims 1-7 and 19 have been considered but are moot in view of the new ground(s) of rejection.

7. Applicant's arguments, see page 7, filed on June 27th, 2003, with respect to claims 1-21 have been fully considered and are persuasive. The 112 rejection of claims 1-21 has been withdrawn.

Allowable Subject Matter

8. Claims 6-7 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and

any intervening claims. The Prior Art does not teach a cache comprising a plurality of independently addressable cachelets in combination with a plurality of load units.

Conclusion

9. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, THIS ACTION IS MADE FINAL. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Midys Inoa whose telephone number is (703) 305-7850. The examiner can normally be reached on M-F 7:00am - 4:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mano Padmanabhan can be reached on (703) 306-2903. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-3900.

Midys Inga
Examiner
Art Unit 2188

MI

8/24/03

MANO PADMANABHAN
SPE - TC 2100